

Protection of Significant Aquatic Communities (Ecozones) in Indiana Lakes and Rivers



Importance of wetlands and other lake and river habitat features

Waterfront property and water-based recreation are significant economic drivers for local communities in many parts of the state. As development progresses around lakes and along rivers, water quality and lake aesthetics must be protected to support property values.

Lakes and their surroundings comprise a complex mosaic of habitats and interacting features. Areas in need of protection may include:

- Shallow mud flats, marshes and other wetlands supporting emergent plants
- Nearshore littoral zones supporting floating leaved and submergent plants
- Offshore areas that support plant communities
- Structural habitat features
- Narrow channels or waterways between lakes

Dudiak (1999) explains that, “Near shore areas which are rich in aquatic plant diversity and abundance represent prime habitat for a variety of fish. The degree to which an area consists of both submerged and emergent macrophytes (rooted aquatic plants) and a dense and diverse population of larvae, snails, and other insects, the greater the variety and numbers of fish that tend to feed and thrive there. Aquatic plants in these near shore areas tend to serve a variety of functions. Plants with large surface area provide shade and cover from predators. Aquatic plants also provide a source of food

for fish, shorebirds, waterfowl, insects and amphibians and form a critical component of the aquatic food chain.”

In his study of Lake Wawasee and Syracuse Lake, Pearson (1998) determined that, “[n]early three times as many fish were captured in channels and along the natural cattail stand as along concrete seawalls. More species were also noted in channels and along cattails than seawalls. Natural cattail areas held more black crappies, bluegills, redear, spotted gar, warmouth, yellow bullheads and yellow perch.”

Kent (1994) notes that, “Wetlands are especially critical habitats for wildlife, and exceed all other land types in wildlife productivity. A majority of wildlife species use wetlands on either a permanent or transitory basis for breeding, food or shelter. Wetlands provide critical habitat for 80 of 276 [federally] threatened and endangered species. Approximately 64 percent of the wildlife in the Great Lakes region inhabit or are attracted to wetlands, including 62 percent of the birds, 69 percent of the mammals and 71 percent of the amphibians and. Wetlands are also the principal habitat for furbearers and waterfowl. Forty-five million ducks depend on wetlands throughout the United States and Canada for their existence.”

According to Cooke, et al. (1993), data from a study of Lake Wingra, Wisconsin provide a strong argument for maintaining the existence of lakeside and upland wetlands. Cooke indicates that runoff water is high in

nutrients in part because wetland detention is absent, and was responsible for impaired water quality. During the summer a marsh around Lake Wingra retained 83% of incoming phosphorus. The use of natural or artificial wetlands to protect lakes has become more common in some areas. Cooke further posits that the loss of most or all of the natural wetlands around lakes and in their drainage basins is tragic and certainly is a causal factor in the deterioration of many lakes. He notes that the shoreline of some lakes has yet to be developed and that the data he has reviewed indicate that the water quality of those lakes would be protected from major nonpoint source pollutant loads if the wetlands were preserved.

Recent reports from long-time observers have indicated occurrences of algae blooms and reduced water clarity in natural lakes not previously known to experience the phenomena. Such occurrences are disturbing because they are indicative of detrimental ecological changes induced by human activity – changes that would normally not occur for thousands of years under natural conditions. They reinforce the need for protection and enhancement of wetlands that trap nutrients prior to their introduction into the lakes.

The U.S. EPA's Clean Lakes Program has included wetlands as lake protection components of several larger scale lake restoration projects.

Wetlands are particularly significant around Indiana's lakes. They provide fish and wildlife habitat, filter nutrients and sediments that may impair water quality, recharge groundwater, and reduce overland flow that could cause erosion and flooding.

Wetland protection policy in Indiana

The Indiana Wetland Conservation Plan was finalized in 1996. It was the product of an extensive process of information gathering, input, and review by a wide variety of interests around the state. Its development was guided by the Wetlands Advisory Group – people representing virtually every stakeholder group having any sort of interest in wetlands, ranging from environmentalists to county surveyors, from farmers to coal mine operators. The consensus of the group was expressed in the plan's goal: "Conserve Indiana's remaining wetland resources, as defined by acreage, type, and function, and restore and create wetlands where opportunities exist to increase the quality and quantity of wetland resources."

The Indiana Lake Classification System and Management Plan (1986) produced by the Indiana Department of Environmental Management contains data on nearly 500 public lakes. It classifies the lakes on the basis of a variety of characteristics and provides recommendations regarding ways in which they can be afforded long term protection. One of the general management techniques listed for a number of lakes is the protection of watershed wetland areas for the maintenance of lake water quality.

IDNR's Lake and River Enhancement program has promoted and funded the protection, enhancement, restoration, and construction of wetlands as water quality protection measures since the program's inception in 1988. The program acknowledges the benefits that wetlands provide to overall lake quality and ecological health.

IDNR developed a non-rule policy in 1995 entitled "Wetland Conservation Guidelines" which directs the department in proactively protecting and managing the state's wetland resources. The guidelines acknowledge the many benefits of wetlands and establish IDNR's intent to "embark on wetland management activities that include protection, acquisition, enhancement, and creation of wetland resources".

Impacts of motorized boating on aquatic plants and habitat

Rooted aquatic plant (macrophyte) growth is limited by a number of factors, including substrate (soil) type, water depth, water clarity, nutrient availability, and physical disturbance from currents, waves, animals, and humans.

Boating may influence many of these factors. Direct impacts may include cutting of plant material, scouring of substrate by propellers and uprooting by boat hulls. Indirect impacts may result from boat-generated turbidity and increased suspended solids in shallow areas which decreases light penetration. Decreased light intensity can reduce photosynthetic rates and limit rooting depth of submerged macrophytes. Sediment deposition on leaves can inhibit photosynthesis as well. Finally, increased wave exposure generated by boats can affect macrophyte distribution, species composition, and growth rates.

Researchers have determined that excluding motorized boats from experimental plots in Wisconsin's Lake

Ripley significantly increased macrophyte biomass, coverage, and shoot height in the plots.

Establishment of authority to protect ecological zones

The statutorily established Lakes Management Work Group recommended in its 1999 final report that, because of watercraft impacts to lake ecology, provision for boating restrictions be allowed in lake areas susceptible to damage by watercraft where important rooted aquatic plant beds exist.

Legislation enacted in 2000 (HEA 1075) amended IC 14-15-7-3 to allow for establishment of zones on public waters where the use of watercraft may be limited or prohibited for fish, wildlife, or botanical resource management, or for the protection of users. Regulations in 312 IAC 5-6-1 allow establishment of zones on specified public freshwater lakes to govern the operation of watercraft for any of the following purposes:

- a. Addressing unusual conditions or hazards.
- b. Fish, wildlife, or botanical resource management.
- c. The protection of users.

In order to be effective, a zone established under this rule must be identified on-site by buoys placed in accordance with 312 IAC 5-4. Watercraft operation may be restricted on specified lakes and reservoirs with state or federal funding under 312 IAC 5-10-1.

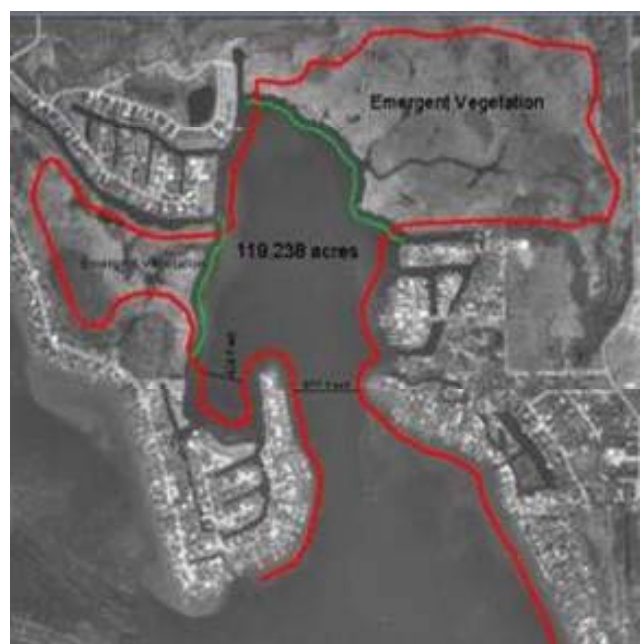
Ecozones first established at Lake Wawasee and Syracuse Lake

With the support of the local community, ecozones were first established in Lake Wawasee and Syracuse Lake in 2002 in accordance with IC 14-15-7-3 and in response to evidence indicating the need to do so.

In 1996, Commonwealth Biomonitoring completed a DNR Lake and River Enhancement program-funded diagnostic study of Lake Wawasee and Syracuse Lake, along with their watershed. The study noted the importance of wetlands to the overall health of the entire ecosystem. The authors point out that, “The wetlands function as natural purification systems for water entering the lakes. They also function as habitats for diverse species of wildlife. The wetland areas, such as Conklin Bay, Johnson Bay, and Mud Lake, are vital to the health of a self-sustaining fishery. These areas presently function as very rich fish nursery areas. From

the observations of researchers on this project, they are very rich in juvenile game fish numbers and species diversity. These areas should be preserved around the lake for a variety of reasons, including their NPS [nonpoint source] pollution buffering, habitat value, wave energy buffering, aesthetic and intrinsic values.”

Photos of Johnson Bay show limited development encroaching on wetland areas in 1951 (top) and greater loss of vegetation along the lakeshore by the year 2000 (bottom).



Commonwealth noted in the diagnostic study that observations from a boat indicated the presence of boat propeller scars in shallow areas of Lake Wawasee, including Johnson Bay.

The report also stated that, "In Johnson Bay, Conklin Bay, and the southeast portion of Syracuse Lake the wetlands obviously need to be protected from skiers skiing up to the edge of the emergent vegetation. The wave energy causes the wetland hummocks to bounce with waves violently, releasing sediments and associated nutrients from the wetland areas." The authors went on to say that, "Based on our visual observations made during the course of this [diagnostic study] project, Johnson Bay, Conklin Bay, Mud Lake, and the southeast portion of Syracuse Lake (also a boating hazard due to stumps and shallow water) are areas functioning as fish nurseries and should be protected as such for a self sustaining fishery. These major wetland areas should be designated as no wake zones to protect the wetlands. In addition, deeper drafting boats, such as inboard/outboard cruisers, cause considerable disturbance (resuspension of sediments and nutrients) to the lake bottom due to the depth of the prop and the thrust needed to propel heavier hulls. These types of boats should be restricted from water less than five (5) feet deep."

Other observers have also noted the effects of watercraft-induced waves on the wetland vegetation in Lake Wawasee and Syracuse Lake. There is considerable anecdotal evidence of clumps of cattails and associated plants being dislodged by wave action, then floating away from the marsh areas into the open water. It is also common to observe emergent and submersed plants from deeper water, uprooted by boating activity, suspended in the water column or floating on the surface.

A general principle of ecology and conservation biology is that species diversity is frequently directly related to the size of protected areas. As the largest natural lake in Indiana with extensive intact wetlands, Lake Wawasee is a unique resource that merits significant protection. Spotted turtles, bald eagles, and other rare or endangered species that have been observed in the area are dependent upon the expansiveness of the wetlands. Relatively small, incremental losses of wetlands may not, individually, cause noticeable ecological changes, but the cumulative impact of innumerable small losses can be dramatic.

Process to establish ecozones

Lake associations or other groups interested in exploring possible establishment of a protected ecological zone should contact DNR. Professionals within the agency, from the divisions of Law Enforcement, Fish and Wildlife, Nature Preserves, and others as needed, would consult with the local organizations and the public to determine whether the concept has adequate public support to proceed with a formal process. Collectively, all of the interested parties would also consider alternative methods for protecting the natural, cultural and recreational interests of the community.

If the concept appears to have adequate justification as an ecozone, the interested sponsoring organization may present a formal rule-making petition to DNR. Based on public input and agency review, the DNR Director would make a recommendation to the Natural Resources Commission concerning the possibility of rule adoption or other approaches that might be appropriate to the circumstances. If rule adoption proceeds, the standard process of public notice and hearings would be used to gain input into the proposed rule prior to final action.

For more information, contact:

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